

## Bindweeds (*Convolvulus* L.: Convolvulaceae) in Victoria

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### Abstract

The Victorian taxa of *Convolvulus* are outlined with illustrations of diagnostic parts, distributions and a key to the taxa. A brief account of the taxonomic history of the group in the state is provided and some features of the species' biology and ecology are discussed. (*The Victorian Naturalist* 128(6) 2011, 10–19).

**Keywords:** Victorian flora update

### Introduction

In 2001 an excellent revision of the bindweed genus (*Convolvulus*) in Australia was published (Johnson 2001). All the native and the solitary introduced species were treated in detail. Four new species were described and a further three previously named but subsequently synonymised species resurrected. Two other new species had been published previously (Johnson 1987). Prior to this, native species in Australia were included in very broad concepts of *C. erubescens* and to a lesser extent *C. remotus*, but the diversity contained within these two 'catch-all' species led to uncertainty of the application of those names. In fact, *C. erubescens* was not considered a member of the Victorian flora by Johnson (2001), and *C. remotus* was a rather rare species for the state. Of the 11 native species recognised by Johnson (2001), seven were from Victoria. One of these, *C. microsepalus*, was known from only two pre-1900 records and it is now regarded as extinct in the state. Subsequent to Johnson's revision, *C. erubescens* has been 'rediscovered' in Victoria, and a further species, *C. graminetinus*, recorded for the state, bringing the tally of Victorian species to 10, with one of these, *C. angustissimus*, comprising three subspecies here (a fourth subspecies is confined to the Yorke and Eyre Peninsulas and Kangaroo Island in South Australia).

### The genus in Victoria

Despite the significance of the revision—elucidating as it does some rare taxa, and some that are highly characteristic of different habitats—it appears not to have been widely taken up by

Victorian botanists. The following is an attempt to improve the understanding of the genus in this state and to update the now inadequate (and to some extent misleading) treatment in the *Flora of Victoria* (Jeanes 1999) where only four species were recognised. The present account draws heavily on Johnson's revision and I am indebted to him for that and his subsequent co-operation in improving my own understanding of the genus in Victoria. Redetermination of herbarium material and the subsequent collections of my own and others have allowed a clearer picture of distribution and ecological preferences of the Victorian species than the revision could provide. The original article provides detailed descriptions of the taxa and much more information on the genus than is supplied here. Important characteristics of the Victorian taxa are summarised in Table 1.

### Biology

Since the publication of Johnson's revision, there have been many large bushfires in Victoria, and post-fire surveys have been the source of novel records of several *Convolvulus* species, in particular, *C. crispifolius*, *C. erubescens* and *C. clementii*, suggesting that these species may be scarce in long inter-fire periods and that the species may not be particularly long-lived. Alternatively, this may be an artefact of increased survey effort after fires. The germination of other species from sites prone to inundation (e.g. *C. wimmerensis*, *C. recurvatus* and possibly *C. graminetinus*) appears to be stimulated by seasonal flooding (pers. obs.).

**Table 1.** Summary of important features of Victorian *Convolvulus* taxa. \*The 'flower stalk' consists of the peduncle + pedicel. In species with single-flowered inflorescences, the pedicel is measured from the two small bracteoles, usually about halfway along the 'flower stalk', to the calyx. In multi-flowered inflorescences, the pedicel of the lower flowers is measured from where it joins the peduncle (one or two bracteoles are inserted at this branching point). Pedicels may elongate in fruit. The ranges here are taken from flowering pedicels.

	Habit	Stem	Pedicel*	Sepal	Corolla (mm)	Capsule (mm)	Seed (mm)	Habitat
<i>angustissimus</i> subsp.	twining	terete, variably pubescent; hairs appressed and spreading	3–23 mm; recurved in fruit	4–6 mm; acute to rounded with short recurved point	9–21	4–8	2.9–4	grassland and woodland; clay to skeletal soil
<i>angustissimus</i>	twining	terete; hairs mostly sparse, appressed	4–8 mm; recurved in fruit	3.5–5 mm; acute to rounded with short recurved point	9–14	6–6.5	3–4	grassland and grassy woodland; mostly clay/clay loam
<i>angustissimus</i> subsp. <i>filifolius</i>								
<i>angustissimus</i> subsp. <i>omnigracilis</i>	trailing, rarely twining	terete, variably pubescent with appressed and spreading hairs	5–18 mm; recurved in fruit	4.5–6 mm; acute to rounded with short recurved point	14–25	5–8	3.5–4	grassland and woodland; clay to skeletal soil
<i>arvensis</i>	trailing and twining	terete or narrowly winged; mostly glabrous	6–22 mm; recurved in fruit	3–4 mm; tip notched	15–30	4–7	3–4	disturbed sites
<i>clementii</i>	twining	terete; moderately to sparsely hairy; hairs ±appressed	3–15 mm; straight to slightly curved in fruit	4–6 mm; long, acute to rounded with a recurved point	6–9	4–7	2.5–3	black box, saltbush and grasslands; clay and clay loam
<i>crispifolius</i>	trailing	terete, rather densely hairy; hairs appressed to ascending	1.5–4 mm; recurved in fruit	4–4.5 mm; tip rounded–obtuse with recurved point	5–6	4–4.5	2.5–3	mallee; sand or sandy loam
<i>erubescens</i>	trailing and twining	ribbed to narrowly winged; moderately to sparsely hairy; hairs crisped, appressed	5–20 mm; straight to very slightly recurved in fruit	5–7 mm; tip acute with recurved point	7–15	4.5–6	2.8–3.7	known only from dryish site with limestone-rich soils in Victoria (elsewhere often a sp. of rainforest margins)
<i>graminetinus</i>	trailing to weakly twining	terete to ribbed, moderately to sparsely hairy; hairs crisped, appressed	3–12 mm; recurved in fruit	3–5 mm; tip acute to obtuse	6–10	4–5.5	2.5–3.5	grassland or open woodland with heavy soils, prone to inundation

Table 1. Continued.

	Habit	Stem	Pedicel*	Sepal	Corolla (mm)	Capsule (mm)	Seed (mm)	Habitat
<b>microsepalus</b>	trailing	terete, moderately to sparsely hairy; hairs ± appressed	3–12 mm, recurved in fruit	2–3 (rarely 4) mm; tip acute	5–10	5–7	3.5–4	unknown in Victoria (elsewhere in loamy or sandy soils in semi arid areas)
<b>recurvatus</b> ssp.	trailing	terete, moderately hairy; hairs ± appressed	2–6, (rarely 8) mm, recurved in fruit	3–5 mm, tip acute to rounded with a recurved point	5–8	4–5	2.5–3.5	heavy soils e.g. in black box–red gum forest
<b>remotus</b>	trailing	terete, sparsely to densely hairy; hairs appressed	3–16 mm, straight to slightly recurved in fruit	5–7 mm, tip obtuse, with or without a short point	8–12	5.5–8.5	3–4.8	grassland, chenopod shrubland on loamier mallee soils
<b>wimmerensis</b>	trailing to weakly twining	terete, moderately to densely hairy; hairs crisped-appressed	3–6 mm, recurved in fruit	5–6.5 mm, rounded with a short recurved point	9–12	5.5–6	3.2–3.8	grassland, grassy woodland on clay or clay- loam soils

## Collecting

When collecting or recording specimens of *Convolvulus*, it is important to note characters which may be lost or not apparent on herbarium specimens—e.g. corolla length and colour, the tendency for stems to twine, habitat, soil type etc. The surface-sculpturing of seeds is highly diagnostic for some species, so ripe fruits should be obtained if possible. The National Herbarium of Victoria will gratefully accept well-collected specimens, with locality and habitat information. Further contributions should allow us to build a more reliable picture of distribution, habitat and conservation status of the genus in Victoria. Potential collectors must ensure that they are appropriately licensed to collect on public land.

## Identification

The key below relies largely on leaf morphology, which, with some practice, provides highly diagnostic field characters. When using the key, however, it is important to appreciate the variation in leaf shape from the juvenile leaves near the base of the plant to those at the growing tip. The leaves described in the key, unless indicated otherwise, are from the adult leaves from the mid- to upper-stems, in the part of the plant where flowers are produced. Summarised distributions in the key are based on current knowledge only. With further collections and improved understanding of the genus, species' occurrences outside their currently known ranges are to be anticipated. Abbreviations of occurrences in Natural Regions of Victoria (Conn 1992) follow those used in Walsh and Entwisle (1994, 1996, 1999).

The leaf and seed illustrations of the Victorian species (Figs 1–3 and 4–6 respectively), expertly depicted by Will Smith, are reproduced from Johnson (2001) with permission. While the leaf outlines give a good summary of typical leaf shapes from the base of the plant to the growing tips (from bottom to top in the figures), occasional plants will be found that deviate slightly from these. Generally though, I have found the illustrations to be a very useful pointer to the correct determinations. Seed surface sculpturing is also highly distinctive for most taxa, but requires magnification at  $\times 10$ – $\times 20$  using a microscope or good hand lens.

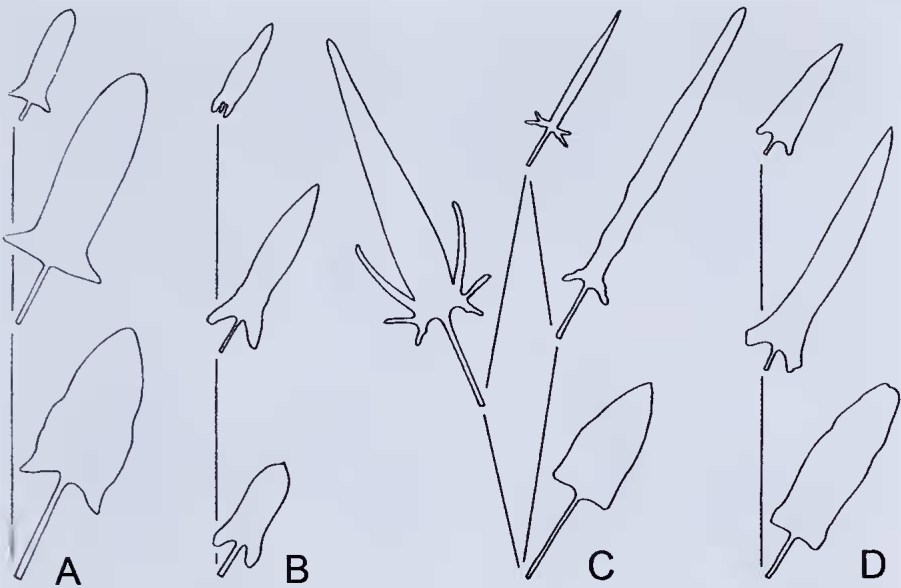


Fig. 1. Leaves (basal, mid-stem, upper stem) of *Convolvulus*. A: *C. arvensis*  $\times 1$ ; B: *C. microsepalus*  $\times 2$  (basal),  $\times 1$  (mid and upper); C: *C. graminetinus*  $\times 0.5$  (basal),  $\times 1$  (mid and upper); D: *C. remotus*  $\times 1$ .

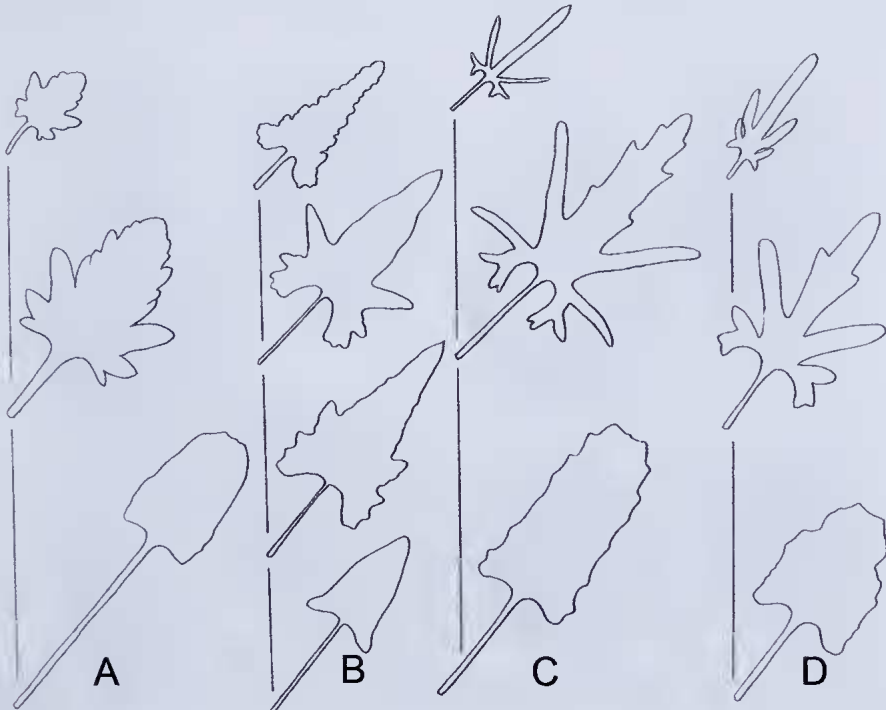


Fig. 2. Leaves (basal, mid-stem, upper stem) of *Convolvulus*. A: *C. crispifolius*  $\times 1$  (basal),  $\times 2$  (mid and upper); B: *C. erubescens*  $\times 0.5$  (basal and mid),  $\times 2$  (upper); C: *C. clementii*  $\times 1$ ; D: *C. wimmerensis*  $\times 1$ .

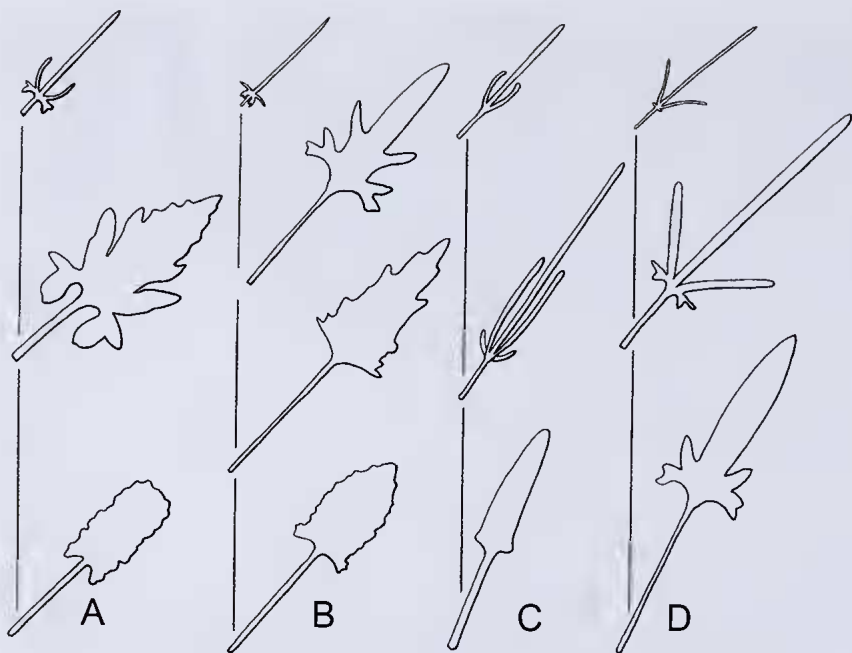


Fig. 3. Leaves (basal, mid-stem, upper stem) of *Convolvulus*. A: *C. recurvatus*  $\times 1$  (basal),  $\times 2$  (mid and upper); B: *C. angustissimus* subsp. *angustissimus*  $\times 1$  (basal and mid),  $\times 2$  (upper); C: *C. angustissimus* subsp. *omnigracilis*  $\times 1$  (basal and mid),  $\times 2$  (upper); D: *C. angustissimus* subsp. *fililobus*  $\times 2$ .

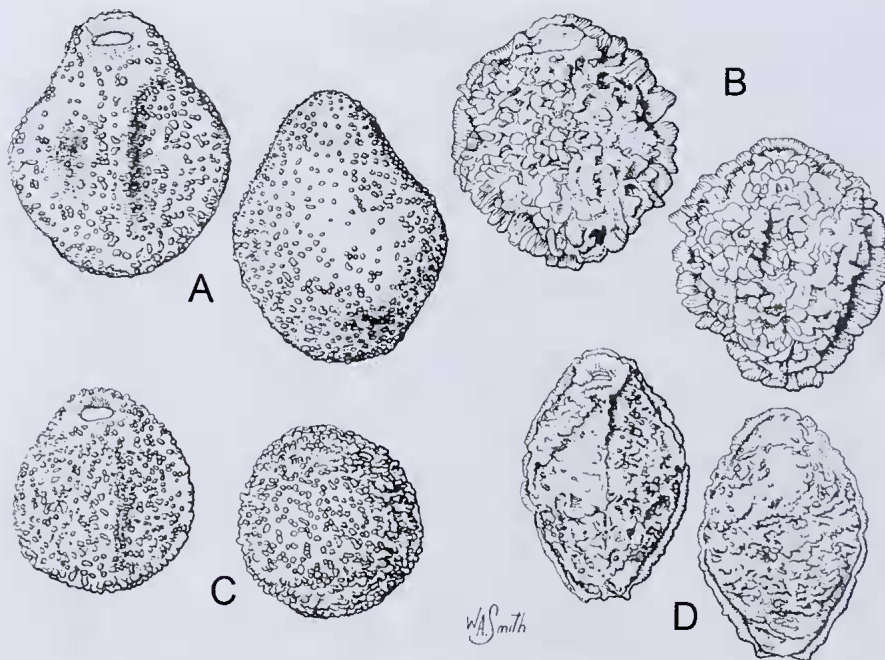


Fig. 4. Seeds of *Convolvulus*, ventral (left) and dorsal (right) surfaces  $\times 10$ . A: *C. arvensis*; B: *C. microsepalus*; C: *C. graminetinus*; D: *C. remotus*.





Fig. 5. Seeds of *Convolvulus*, ventral (left) and dorsal (right) surfaces  $\times 10$ . A: *C. crispifolius*; B: *C. erubescens*; C: *C. clementii*; D: *C. wimmerensis*.

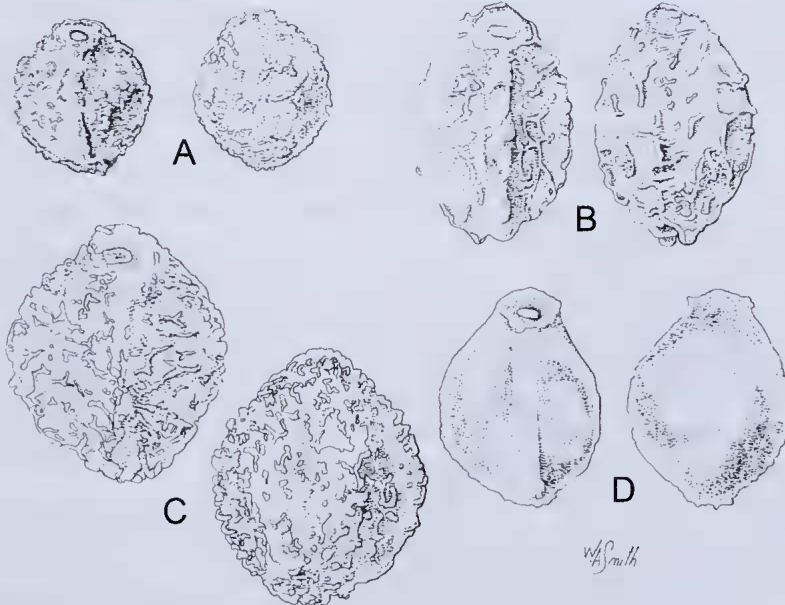


Fig. 6. Seeds of *Convolvulus*, ventral (left) and dorsal (right) surfaces  $\times 10$ . A: *C. recurvatus* subsp. *recurvatus*; B: *C. angustissimus* subsp. *angustissimus*; C: *C. angustissimus* subsp. *onnigracilis*; D: *C. angustissimus* subsp. *fililobus*.

**Key to Victorian taxa of *Convolvulus***

1. Leaves hastate, sagittate, oblong or digitate, but not developing a distinct narrow (<2 mm wide) central/terminal lobe more than 5 times longer than the basal lobes (when present); fruiting pedicels straight to recurved ..... 2
1. Leaves with a distinct, narrow central lobe more than 5 times longer than short basal lobes, 2 mm wide or less; fruiting pedicels distinctly recurved ..... 11
2. Sepals ≤4 mm long, very blunt, with a shortly notched apex ..... 3
2. Sepals >4 mm long, acute to rounded at apex, usually with a short point, never notched ..... 4
3. Petals 15–30 mm long; sepals 3–4 mm long; vigorous weed, widespread, mostly disturbed or degraded sites ..... \**C. arvensis* (MMAL, WAN, RIV, MID, VOLC, OTPL, GPL)
3. Petals 5–10 mm long; sepals usually <3 mm long; rather sparse native recorded from the far north-west, but now possibly extinct in Victoria ..... *C. microsepalus* (LMAL, WIM)
4. Leaves without obvious lobes, margins crenate or serrate; surfaces silky-pubescent with rather dense, ±appressed hairs; mallee areas of north-west ..... *C. crispifolius* (MMAL, LMAL)
4. Leaves usually with distinct (although sometimes short) basal lobes, sometimes ±digitate, margins generally entire, surfaces glabrescent to rather densely hairy, but not appressed-silky pubescent ..... 5
5. Leaf margins entire throughout the plant (ignoring short basal lobes if present) ..... 6
5. Leaf margins, at least near the base of plant, distinctly toothed or lobed ..... 7
6. Fruiting pedicels distinctly recurved; capsule ≤5.5 mm long; mature seeds patterned by small distinct tubercles only; petals to 10 mm long; northern plains and drier eastern ranges (Omeo area) ..... *C. graminetinus* (RIV, EHL, EG)
6. Fruiting pedicels straight or gently curved, but not recurved; capsule 5.5–8.5 mm long; mature seeds patterned by both tubercles and low ridges of irregular length; petals 8–12 mm long; mainly mallee areas of the north-west (outliers at Mt Arapiles and Wilsons Promontory) ..... *C. remotus* (MMAL, LMAL, WIM, GR, RIV, PROM)
7. Corolla <9 mm long; far north-west Victoria only ..... 8
7. Corolla >9 mm long; plants of east or west, but rarely of the far north-west ..... 9
8. Fruiting pedicel strongly recurved ..... *C. recurvatus* subsp. *recurvatus* (MMAL, LMAL)
8. Fruiting pedicel straight or sinuate but not strongly recurved ..... *C. clementii* (MMAL, LMAL)
9. Fruiting pedicels straight or sinuate; flowers 1–3 per axil; leaves shallowly lobed only, ±glabrous, at least above; stems ribbed to narrowly winged; confirmed from limestone areas of Gippsland, earlier records (Melbourne and Dookie areas) are based on specimens of dubious provenance ..... *C. erubescens* (?RIV, ?GPL, EG)
9. Fruiting pedicels distinctly recurved; flowers usually single (rarely two) per axil; at least lower leaves deeply and distinctly lobed; stems terete ..... 10
10. Leaves rather densely covered with ±appressed hairs, greyish, usually ±digitate, basal lobes usually >half as long as central lobe; north and west Victoria ..... *C. wimmerensis* (MMAL, LMAL, WIM, WAN, RIV)
10. Leaves glabrescent to moderately covered with spreading hairs, green, the central lobe usually >twice as long as basal lobes; widespread ..... *C. angustissimus* subsp. *angustissimus* (MMAL, WIM, WAN, GR, RIV, MID, VOLC, OTPL, EHL, GPL, PROM, SNOW, EG)
11. Corolla <9 mm long ..... 12
11. Corolla >9 mm long ..... 13

12. Sepals  $\pm$ glabrous to sparsely hairy; fruiting pedicel 2–12 mm long; seeds fairly evenly tuberculate, lacking ridges, unwinged; northern plains and drier eastern ranges (Omeo area) ..... *C. graminetinus* (RIV, EHL, EG)
12. Sepals moderately to densely hairy; fruiting pedicel 3–6 mm long; seeds patterned by irregular tubercles and short ridges with an irregular marginal wing around the margin; far north-west Victoria only (*C. recurvatus* subsp. *nullaborensis* is confined to WA and SA) ..... *C. recurvatus* (MMAL, LMAL)
13. Corolla to 10 mm long; seeds fairly evenly tuberculate; peduncle and stems usually narrowly winged or ribbed ..... *C. graminetinus* (RIV, EHL, EG)
13. Corolla to 25 mm long; seeds with low irregular ridges, or virtually smooth with a narrow marginal ridge or wing; peduncles and stems terete ..... 14 (*C. angustissimus*)
14. Lower cauline leaves broad, deeply divided, often  $\pm$ digitate, with the central lobe >1.5 mm wide; basal lobes usually reducing and central becoming narrower toward tip; corolla 9–21 mm long; widespread ..... *C. angustissimus* subsp. *angustissimus* (MMAL, WIM, WAN, GR, RIV, MID, VOLC, OTPL, EHL, GPL, PROM, SNOW, EG)
14. Cauline leaves with narrow lobes almost from the base of the plant; lobes <1.5 mm wide; mostly western and northern ..... 15
15. Seeds smooth; flowering pedicels 4–8 mm long; corolla 9–14 mm long ..... *C. angustissimus* subsp. *fililobus* (MMAL, WIM, GR, RIV, MID)
15. Seeds irregularly reticulate with low, narrow ridges; flowering pedicels 5–18 mm long; corolla 14–25 mm long ..... *C. angustissimus* subsp. *omnigracilis* (RIV, MID, VOLC, EHL, GPL, EG)

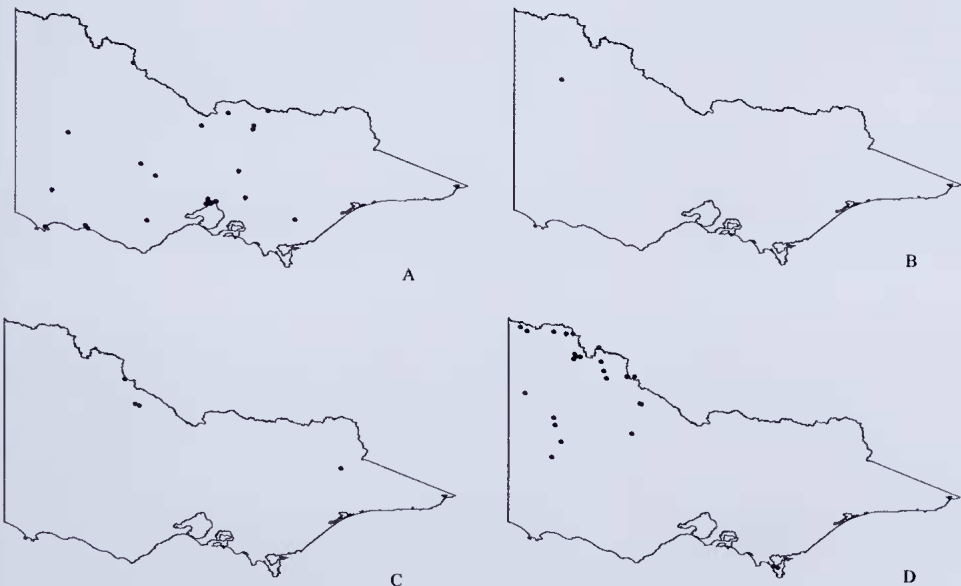


Fig. 7. Distribution of *Convolvulus* in Victoria. A: *C. arvensis*; B: *C. microsepalus*; C: *C. graminetinus*; D: *C. remotus*.



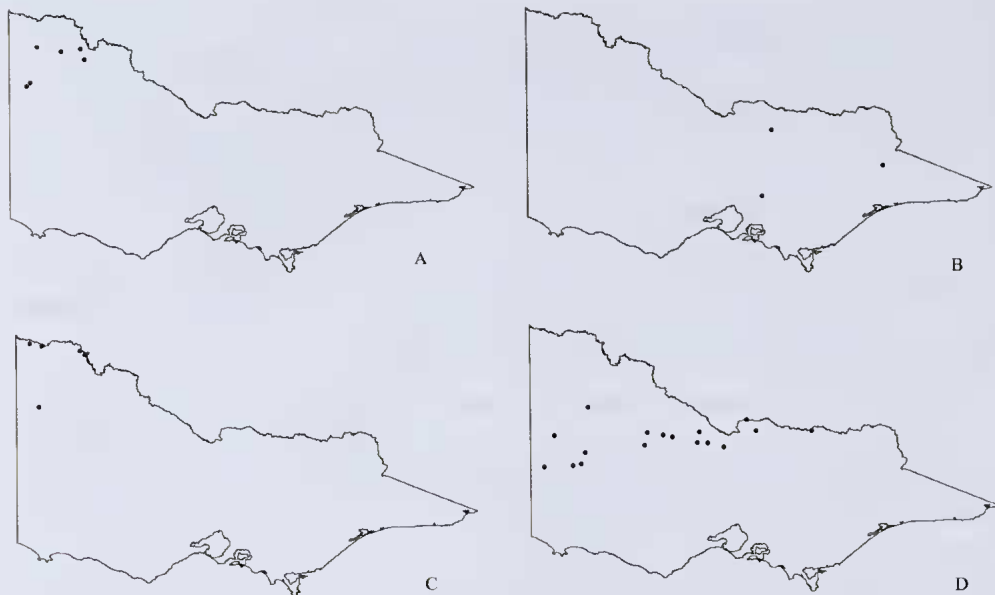


Fig. 8. Distribution of *Convolvulus* in Victoria. A: *C. crispifolius*; B: *C. erubescens* (only the easternmost record is recent and reliable); C: *C. clementii*; D: *C. wimmerensis*.

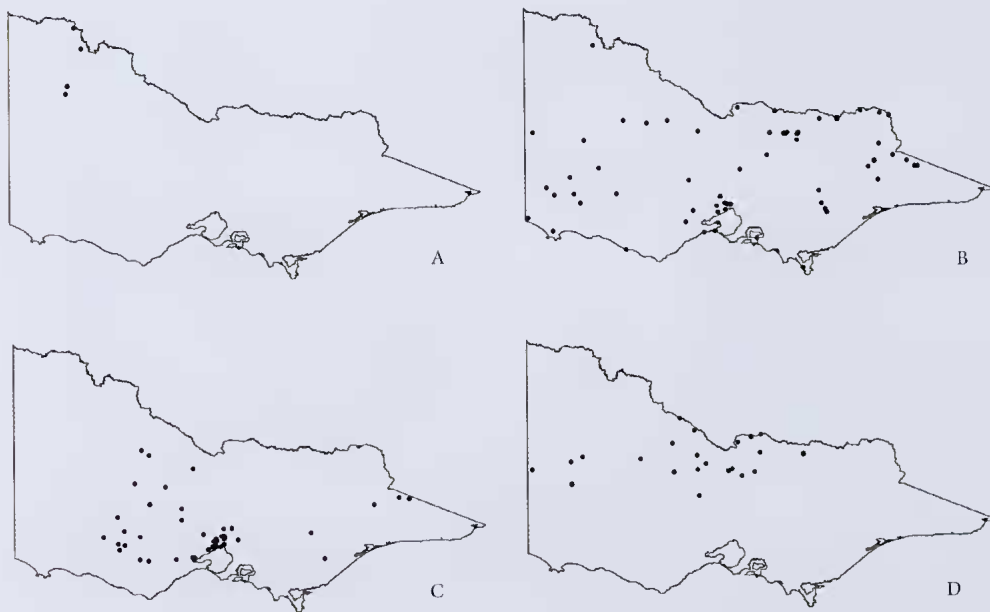


Fig. 9. Distribution of *Convolvulus* in Victoria. A: *C. recurvatus*; B: *C. angustissimus* subsp. *angustissimus*; C: *C. angustissimus* subsp. *omnigracilis*; D: *C. angustissimus* subsp. *fililobus*.

Distribution maps, derived from specimens held at the National Herbarium of Victoria, are presented in Figs 7–9.

### Acknowledgements

I am very grateful to Bob Johnson (Brisbane Herbarium) for his generous assistance in improving my understanding of the genus, and for allowing his work (and the illustrations of his colleague, Will Smith) to be presented here with minor modifications. I thank too my colleague at the Royal Botanic Gardens, Alison Vaughan, for preparing the distribution maps.

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## One hundred and five years ago

A BOTANIST AT MOUNT BULLER

By DR. C.S. SUTTON

(Read before the Field Naturalists' Club of Victoria, 14th Jan., 1907)

...The Upper Paleozoic area of Mansfield is described by Mr. Reginald Murray as beautifully park-like in character—well grassed and thinly timbered, and having been long settled and always well stocked, the original flora has naturally suffered. In effect the only flowering plants seen on the flats were *Pimelia humilis*, *Goodenia pinnatifida*, *Viola hederacea*, *Vittadinia australis* [sic], large patches of *Lobelia pedunculata*, *Erythraea australis*, *Convolvulus erubescens*, and a profusion of *Hydrocotyle laxiflora*, often betraying itself by its characteristic colour, and *Helipterum dimorpholepis*. Among the low hills lying close to the town, and which seemingly had never carried much timber or scrub, my fortune was better, for I found *Hibbertia obtusifolia*, with its fine large bright yellow flowers, everywhere, and collected the curious little composite so like a gnaphalium, *Stuartina Muelleri*. The still smaller *Rutidosia pumilo* was very plentiful, and the charming little alien, *Alchemilla arvensis*, or Lady's Mantle, was noticed, as were also *Asperula oligantha*, *Galium australe*, *Ranunculus parviflorus*, in seed, and *Caladenia pattersoni*, of very low growth, *C. carnea*, and *C. congesta*, the last with a very characteristic and not unpleasant perfume.

From *The Victorian Naturalist* XXIII, p. 175, February 1907

## One hundred and twenty-seven years ago

TO WILSON'S PROMONTORY OVERLAND

By J.B. GREGORY AND A.H.S. LUCAS

### PART III

...In the Forests tree-ferns filled every gully, and added a charm to every prospect. The mighty Eucalypts with their white trunks towered all around us. Ever and anon as we wound along our ridge track we skirted the head of some valley, which widening out below gave us a view of the timbered heights around and beyond. In the deeper gullies the creeping and climbing ferns formed green bowers of tropical luxuriance without tropical discomfort, as cool as they were lovely. It seemed a desecration to cut the fronds of the tree-ferns in sheaves for our beds, but nature had provided enough and to spare. We found a pretty creeper around the fern-trunks, *Fieldia australis*, the only Victorian representative of the *Gesneraceae*. It was in fruit. The berries are as large as a cherry, pure white, and with the rows of seeds visible beneath the epicarp. Mr. Robinson called our attention to *Sarcochilus parviflorus*, a pretty and fragrant epiphytic Orchid, which was in full flower. The plants were climbing about dead twigs of probably the Musk Aster. The latter was as usual abundant, and filled the forest paths with a pleasant and not overpowering aroma. *Convolvulus marginatus* and *Billardiera longiflora*, the white corolla of the former tinted with purple, and the lemon-coloured flower-bell of the latter tipped with violet wedges, were also in bloom.

From *The Victorian Naturalist* II, p. 88, October 1885